PYRO TECHNICS

THE NOW & THEN NEWSLETTER OF
GENERAL TECHNICS

PERPETRATED LARGELY BY
JEFF DUNTEMANN
& CAROL DUNTEMANN

GENERAL TECHNICS

NO. 8 JULY 1977

ROBOTS

I remember very few of my preschool dreams, but there is one I will never forget: In the dream I was playing quietly in the livingroom when I became aware of a monstrous rhythmic smashing noise, which grew louder and louder until I was paralyzed with fear. I looked out the bay window onto the street, and at once an enormous, blockish metal foot as large as two houses side by side smashed down on the houses across the street, utterly flattening them. The foot supported a metal leg thirty feet in diameter, and all I was seeing was one step in a gigantic stride--for the leg pivoted forward, the foot lifted, and the thing was gone. I screamed, and awoke.

It was a robot, of course. Lots of 5-year-olds in the Fifties had nightmares about robots. Robots were cubistic parodies of human beings, usually large, and always incredibly strong. They were not always evil, but they were always mysterious, not to be trusted, and always to be kept an eye on. TV and the movies were full of them.

God knows why people really fear machines, but they do. As a symbolic figure, the humanoid robot represents the worst such fear--that hybrid of a powerful mechanism and an inscrutable, largely human mind. The Fifties fear of robots was partly a sort of future shock--technology was advancing so quickly that the non-technical common man was afraid it would someday turn around and bite him in the ass.

The Sixties saw robots go back into the closet, coming out only as clowns or mechanical butlers. Media placed the cloak of menace over something called a computer, which was a parody of the human mind as much as the robot was a parody of the human body. These new bogeymen were even less comprehensible than robots, which at least have moving parts.

Slowly, ever so slowly, the popular mind has grown more sophisticated. Computers have not yet taken over the world a la Colossus, so perhaps they won't after all. Except for such crap as Demon Seed there's been very little computer phobia in the Seventies--the computer as inscrutable villain died with poor HAL 9000's glowing memory crystals.

With a film called Silent Running, something new came up: robots as cute, sympathetic, lovable creatures who serve man the best way they know how. The tiny battered little robot holding a watering can over a little tree is a touching reversal of technophobia. Here it's the machines which are struggling to muddle through after men have made a mess of things. In Silent Running, a robot was the last caretaker of Earthly beauty.

All of a sudden we have Star Wars, and cinema robots have reached maturity. Artoo Deetoo and Threepio are at once funny, heroic, innocent, and even sad. They obey orders, as all robots should, but that's hardly the most important thing about them. For the first time, robots can be trusted. Huey and Dewey, for all their cuteness, still have a certain mystery about them; recall the scene in Silent Running where one nudges the other as Bruce Dern enters the room. Artoo and Threepio hide nothing. They are not human, but they are totally with us. They have no private games of their own.

And this is where it stands. At last the public can grasp robots less as wild animals or dangerous alien intellegences than as friends, or at least something like intellegent, loyal dogs. The April issue of Interface devoted a good deal of space to the concept of robot as pet and companion of children. The image is of a furry, cuddly, dog- sized thing on pliable tractor treads which guards, entertains, and educates young owners. At first glance the article seemed preposterous; at second glance much less so. The means are ours or very nearly ours. Memory and microprocessors are getting very small.

But why waste such an incredible companion on the young? Come the first few decades of the next millennium, the real problem is going to be taking care of old people, not infants. Plainly, looking at the direction our culture is going, our children are not likely to look after us when we grow old and childish. Could we not create semi-intellegent machines to care for the elderly? I don't mean a cold, ruthless monster programmed to keep gramps minimally clean and fed and discreetly out of the way. That is a true technophobe's vision. I mean a quiet, slow, patient furry module which will tirelessly listen to me ramble, purr appreciateively when I pet it, and call an ambulance if I have a stroke. From a machine which thinks to a machine which loves should be no enormous step.

I can already hear the waterheads shouting "Phony!" upon such love. Phony? When men create a toaster, does it pretend it's a can opener? No. It remains a toaster, and toasts as well as it is able. Machines may be many things, but they are not phonies. If they are built to love, they will love, faithfully and wholeheartedly. If I live to be 90 or 100, I will want such a machine. It will love me with all it has, and that sort of love is hard for a senile old man to inspire in anyone else.

If mankind ever creates a soul, it will be a soul worth loving. It is harder to tell truth than forge lies, and once thinking machines are possible, it will certainly be easier to program love and loyalty than cruelty and deceit.

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GENERAL TECHNICS is an organization of fannish techies (and not techish fannies, as some wiseass reported) who share data, resources, and experienc in pursuit of a good time and occasional profit. The group meets mainly at cons, hamfests, and private Berserker Weekends.

MEMBERSHIP is terribly difficult to obtain. You must somehow scrape up a number of 13¢ stamps, and then at great effort write a letter explaining what your qualifications as a techie are to

Jeff Duntemann
6424 N. Albany Avenue
Chicago Illinois, 60645

including those stamps. If the above person can read your handwriting you are an

APPRENTICE TECHIE and entitled to call yourself a member of General Technics. You will also receive

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SECRET MASTER UV TECHNOLOGY (SMUT) you had better talk to

Tullio Proni
1309 Wells Place
Kalamazoo Michigan, 49001

because I don't have anything to do with it.

ANYTHING ELSE, ask me. I may not know but I'll tell you anyway.

QUARKS

Alas for Techie-Talkies, Lithic Systems is dead. Lithic Systems, if you recall, was the producer of the LP 2000, a single chip 100 mw CB or what have you transmitter chip. They had annpunced the LP2700 (pointed out to us by Rod Smith some time ago) which was a complete transceiver on one chip, but never actually put it into production. Now, we hear, the owner of Lithic has fled the country, leaving behind 25 unemployed engineers and a few million dollars in debts. Lithic's midwest distributor has the last 2 LP2000's in the country, which is enough for a pair of techie talkies, but we somehow have a hunch he'll be loath to part with them. The gentleman does realize the demand for such a chip, however, and is frantically searching for the chip masks so production can resume. (Then again, if Mr. Lithic had them in his suitcase when he bought his ticket Out, the next wrist radios you see could be Japanese. Ahhh, so!)

Mike O'Brien will apparently be doing all his future thinking in a tank. No, he hasn't joined the army. He got a job offer from Rand, out California way, and will be leaving us at the end of July. Out of the icebox into the frying pan...perhaps these last few 100 degree days will make him a little less eager to leave Chicago's...ah..variable clime.

Your editor sold an article to 73 Magazine a few weeks back, centering on a program for the COSMAC microprocessor which generates dits and dahs for morse code.

George Ewing is summering it in Mt. Pleasant, MI, where he is completing his Masters work. George has his ham rigs along, and for you less ether-oriented types his address until August will be: Apt. 389D, Deerfield Village, Mt. Pleasant MI 48858.

Cosmo Klein (your editor's microcomputer) has matured considerably since last issue. He now has 512 bytes of CMOS RAM, 256 bytes of EPROM, 5 output ports and an ASCII keyboard.I've ordered the video graphics chip featured in the July Popular Electronics, which puts out a video memory dump of any selected page or pages of memory as white dots and black spaces. I have also ordered a Selectric interface kit from Lillipute for good IBM hardcopy output, but as yet it has not arrived. It's only been seven weeks. Heck, a pregnant woman takes nine months to get results....

Robots are getting to be quite a big thing with the GT hardcore tinkerers. Now that Joe has made such a hit, Steve Johnson, Tullio, and Doug Price all have robots underway. Your editor does too, and would be farther along had not some brother-in-law of a sea-urchin turd ripped off his motors from his apartment building vestibule ten minutes after they were delivered.

Your editor desperately needs a CMOS chip 4428. Anybody having one of these chips or who knows where to get them will be richly rewarded for turning said chip or information over to editor. (Carol just made some dynamite brownies, people...)

Speaking of needs, your editor also needs more news to fill this Quarks column. This is your chance to brag about the wahtsis you're working on, or to plead for help or parts, or just to let us know what you're up to. Quarks is a news, gossip, and mutual assistance column for GT; a kind of continuous floating bulletin board. Don't you just love to see your name in print? Sure you do! You know where to send it, folks...

Guess in what issue of 73 you could buy a 7442 for only $5.95 (see page 1) and win a free 5-watt power monode!

NERTZ & BOLTS

GT LOOKS AT BOOKS

BY TULLIO PRONI

Lest Darkness Fall, L. Sprague DeCamp Ballantine Books, $1.50 1975. Yes, this is definitely techie fiction. True, it takes place in 6th century Rome when our hero (an archeologist) is dumped by a convenient lightning zap into the fading days of the empire. There are no time machines or Blinkenlights. Nevertheless, this book is an inspiration to all techies and a nice adventure story with a touch of humor.

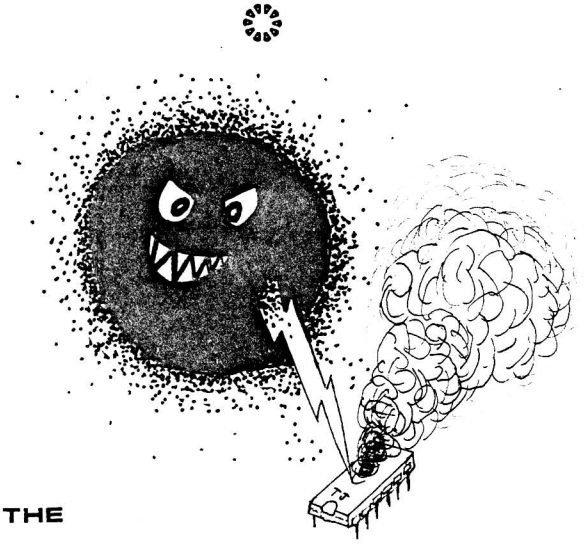
It takes us to Rome when the dark ages are falling. After punching a pillar to make sure he isn't dreaming, our hero quickly concludes that he has been transported into the past and must make the best of it. This he proceeds to do with wit, intellegence, and a ragged assortment of the local inhabitants. These include a homesick Vandal, a banker (who is "honest, but you have to watch him,") a Byzantine general, and an assortment of Goths and Latins.

The fact that our hero knows his history helps-- in fact he finally does keep "darkness from falling"-- but this is a story of an intellegent man with only a slightly more than ordinary knowledge of the inner workings of the devices that make our modern world run. This doesn't solve all his problems at once. In fact, they get him thrown in jail several times, but he does manage. His failures make the story more entertaining and realistic. For example, he finally gets a printing press working, only to discover that he has used up all the "paper" available. (Sheepskin parchment don't grow on trees, in other words!--Ed.) His experiments with gunpowder get nownere.

This book is fun. It has more than its share of humorous characters and amusing situations but it remains primarily an adventure story. The author doesn't spend time explaining how the hero was sent back in time nor does he worry about paradoxes. He just out-and-out tells you that a parallel world is being created and gets on with the action. His hero is believeable. He doesn't spend all his time thinking dark thoughts and probing the meaning of existence as the "New Wave" heros are prone to do. (Barry Malzberg eats decayed kelp!--Ed.) No, he goes out and builds things and lives life. Which is, after all, what most techies want to do.

The book is a re-issue of a 1939 story so a few of the details are dated (like silver coins.) However, if you need a lift or inspiration then this is the book to read. Why, after the first time I read it I went out and tried to build a cannon. Like the one in the book it didn't quite work but I was much younger then...

(And because it didn't work, he has lived to be much older now.--Ed.)



THE GLITCH GATE STRIKES !

BY AL DUESTER & TODD JOHNSON

2 months and 2 days ago Minicon 12 happened to Minneapolis. The con itself was very enjoyable, with surprises popping up everywhere, some of which predictably occurring via Murphy's Laws: the 5X7 foot TV system going out; my battery charger starting on fire (which is what happens when you try to pull 1 amp out of a 300 mil xfrmer); handles falling off plasma weapons, and the like.

However, there were some pleasant surprises in store, for what can hold a techie to panels on humor in SF when he knows there is an open scrounge store elsewhere in town? Not an ordinary scrounge place, mind you, but one of the highest caliber, even though the prices were higher than the norm. Why, they even have a pop machine in the back where you can get it cold for just a measly dime! I know I drank enough to make up for any possible extra expense on a few of the parts. And, the owners assured me that as long as they are there, the machine will have 10¢ pop in it. That alone made it worth the 1 klick walk from the hotel. Of course, it doesn't help if you turn right instead of left at the corner, like someone else I know.

Anyway, they be ACME (really!) Electronic Liquidators ("Yeah, and then I blew him away with my trusty ACME Electronic Liquidator..."--Ed.) their address being 224 North Washington in Minneapolis MN if my memory serves me correctly, and even though they don't have 50 amp triacs, they have loads of pots, caps, and other unusual stuff. This is a must when in town. (I went there three times over the course of the weekend.) This is also the only place I know of that sells 5W power monodes on the surplus market. I sent one along to Jeff with this article, so if you don't believe it, ask him. (I use it to crack nuts, sound out studs in the walls, and prop up the short leg of my workbench. Almost as useful as commercial television!--Ed.)

Also at Minicon, we tossed around the idea of printing up a small book, or maybe not so small, known as The Compleat Techie. This would contain schematics, PC layouts (on one-sided pages, for Ghod's sake, so you can rip it out to make a negative without destroying the book...are you listening, PE?) of favorites old and new, and in between, some sections on techniques, such as working on plexi and sewer pipe, making C4, etc. I think someone should be appointed (I'm glad you said that--Ed.) or appoint themselves to the task as acting as central collection point, we should get a prelim printing date, and that the rest of us should get off our duffs and start writing schematics, but neatly. A new circuit for the 555 isn't any good if you show pins 1, 8, and 3 all tied together. (It'd make a damn good fire starter!--Ed.)

(Editorial insertion////I hereby appoint (after all, he suggested it) Mr. Al Duester as Collector and Editor in Chief of the Ye Compleat Techie project. Send all your contributions to him in Holland. He'll do a great job! He'd better!)

Lack of Space--the final frontier. These are the voyages of the Starship Improvise...its mission to seek out new parts...new suppliers...to bring TVI to places it has never been before.

Captain's Log, Stardate: 7490.45...while on a pickup mission to the planet Sigma Alpha in the Lithic System for the transfer of an emergency shipment of LP2700 subspace transmission units destined for the Klingon border outposts, we have run into a slight...problem.

Transporter Technician Harrision apparently replaced a tunnel diode assembly in transporter three, which had failed under normal testing. The new assembly was hooked up in reverse, with the result that when the transporter officer on watch tried to beam the landing party to the surface for supervision of the transfer, the Improvise was transported to the planet's surface, destroying the LP2700's and their manufacturing facilities, and an area of the city roughly 200 meters square. Casualties are running roughly 15%, including the landing party, which is still in synchronous orbit.

But seriously, folks, the LP2700 is dead, at least for now. I called the distributor, who has partial control of Lithic Systems, and according to him, Lithic is temporarily out of business. It seems that the cost of starting production of these beauts is more than what the company has. They are currently trying to accumulate the capital because they want to go into production. I did get a possible price range of between 25 and 50 bucks each, and this is not certain. I hope we can get them cheaper than that. I should be able to get more info before Windycon, but no Techie Talkies for this Worldcon, it looks like.

I would still like to suggest that we start assigning the 2 digit ID numbers to Masters right away. That way, if somebody does get some goodies going, we'll be ready to run.

A short report on X-Con before I leave you to your dabbling. Tullio, Renee, and I arrived in Milwaukee on Friday night after a hectic day. It started when I drove to Kazoo, supposing to meet Tullio and Renee for a viewing of Star Wars before taking off for the con. Renee, however, missed the early train, so Tullio and I stayed for SW. The fun started after the movie, as Tullio went in his car to pick up Renee at the train station. I followed him, and I swear, the Force must have been guiding him, because he thought he was a Rebel fighter, the way he was weaving through traffic. Of course, I kept up with him, so...

The high point of the con was when Steve arrived Saturday night, with Joe. We had Joe chasing stewardesses in the hotel lobby, running down halls, into elevators, and into the bar. This stopped all activity when the female vocalist saw this trash can tooling down the aisle toward her. It resumed after Joe failed to buy a drink. Next, into the masquerade, where he won first prize over the seven human contestants, amid many cheers from GT supporters, and grumbling among a few malcontents who vowed to have all robots excluded from future masquerades.

The best part was when we took Joe down to the disco in the basement of the hotel, and sent him charging onto the dance floor. Several nubile young ladies forsook their jock partners for a short time so they could bump with Joe, and he even won approval from the DJ, who said, "I don't know what it is, but if it can dance, it can stay," and dance Joe did, for a short time. We then sent him into a mundane wedding party, where after much consternation he was asked to leave.

Next year should be better at X-con, as we will be in a different hotel, rather than the red carpet, which must have been designed by a bunch of drunken 4-dimensional engineers. But enough bitching about that.

There will be a small Berserker weekend at my house on the weekend of August 6. Most of you will have received a flyer by the time this hits the mail. Since I won't be getting to all of you due to a severe stamp shortage, someone will be getting in touch with you from your immediate area. Some sparse info: it's that weekend because of the 8th WLAV raft race that Saturday, and I know many of you will want to attend. It's a big party with thousands of people, and lots of fun. Those of you wanting to build a raft, call me at (616) 335-9456. I live about 3 miles from the state park on Lake Michigan, so if we want, and someone brings a tent, camper or trailer, we can stay all night for a small fee. Bring your hang gliders!

FORKS AND DÆMONS

BY MIKE O'BRIEN

This time we'll get around to explaining the title. I promise.

Last time we covered the story of the Invisible Man, starring the operating system. Now we'll cover the Invisible Man's Revenge, with the same cast.

When operating systems first started to provide users with services which they would otherwise be forced to implement themselves on a barebones machine, operating system theory promptly took off in as many directions as there were operating systems theorists. Basically, these can be divided into roughly three classes, described as let's think about it, let's do it, and let's cover my ass. It should be obvious to even the most trivial observer that most vendor operating systems fall into the latter category. But of that, as they say, anon.

The first category of operating system is easily dealt with, as it by it's very nature has very rarely put in an appearance. Since the computer field is almost unique in that it very quickly makes it obvious when something isn't working (though that may not stop vendors from selling it - see category 3), the implementation of very complex theoretical models rarely goes to completion. There are a very few systems which are derived primarily from theoretical models, INTERLISP being one of them, but they are definitely in the minority. Generally they tend to be spectacular, either as successes, failures, or unclassifiable mind-benders. INTERLISP falls into the latter category, and may rate a separate column later.

The second type of operating system is the sort that George O. Smith would have implemented had he been a computer systems jock. They are in general put together by a relatively small number (one or two) of very competent people who are out to build something that works, without having any particular axe to grind. Such systems range from mediocre to splendid, depending on the talents of the authors. UNIX, on which this newsletter is put together, is in the splendid category.

The latter type of operating system is generated to maximize job security. The people who sell computers are the chief offenders in this category, with IBM leading the pack. These systems do do the job, but they are extremely difficult to approach ("What did he say?" "He said you can't understand them." "Oh."). There is a proverb in the field which says "An elephant is a mouse with an IBM operating system." Only those who have been specially trained in the system (read, "initiated into the mysteries") are able to deal with the system. I won't attempt to describe even what I've heard about the internals. Instead, I'll try to show how the system I use works.

The first thing I want is to tell the machine what to do. That's elementary enough. All I want is to sit down at a terminal and type, and have the dumb machine run the programs I tell it to. Like the editor, one or another language compiler, the program I'm working on, etc. Of course, there has to be something on the other end to eat what I type, and start the program running. This command line interpreter, which is called the Command Line Interpreter on some systems, is called the "shell" on this system, since it sort of sits like a shell between you and the system. Actually it just looks that way. The shell is a program like any other, with no special privileges. It eats what you type and tries to figure out what you meant. It isn't particularly intelligent about this, of course. You can't just walk up and type, "I wanna run a C compile". Instead you type "cc thingie.c". The first word is the name of the thing you want to run, and the rest of the words (or "arguments") tell it what to do, how to do it, and so forth. "cc" is the name of the C compiler (C is a language...more later on that), and "thingie.c" is the name of the C program you want to compile. Then you press the RETURN key, and off it goes.

And now (with minor fanfare), a partial explanation of the title of this column!

To run a program, the shell, which is itself a program, must somehow split in two. It does this by executing a rather peculiar system call called "fork". The operating system then takes the shell program (like M&M Enterprises in Catch-22 everybody owns one and everyone gets a share) and makes a copy of it, identical to the first one in every respect and all ready to roll. The only difference between them is that when the original comes alive again after making the "fork" call, it gets a number from the system which is the ID number of the other copy of itself, and the copy gets a zero back. Hence it knows it is a copy. The original is called the "parent", and the copy is called the "child". Yes, Virginia, there are times when population control can become a relevant problem. You have to make sure the death rate matches the birth rate.

The child process then does an "exec" system call, which means that it hands the operating system the name of a program, and says, "Here, go run this." The operating system does so by throwing away the child process and replacing it with the program to be run. You might call the result a "changeling". It's a completely different program, but it inherits every attribute of the child including its ID number.

The parent, meanwhile, which is the original shell, has nothing in particular to do which the child is off running, so it executes a "wait" system call. This tells the operating system, "Say there, I just had a kid, and now I've got nothing to do till the kid finishes all the work, so how's about putting me in suspended animation till he's done, so I won't take up any space or any machine time?" A wordy request, but basically simple. It sends the calling process to sleep until one of its children is gone. When the changling program (still called the "child", since the parent doesn't really care - this anthropomorphism is getting ridiculous) is finished, or encounters an error, or dies for any other reason, the parent wakes up from its "wait", and gets some status back from the system on why the child died, i.e. normal termination or an error. It then reports any error to me on my terminal, and sits back and waits for another command from me. All this can take no more than a quarter of a second or so, if the command is a simple one.

Of course, the shell need not wait for the child. If I tell it, it will start up the child and come back to me right away, so I can have several things going on at once if I do this repeatedly.

And now, to wind up, the other half of the title!

The child can, if it wants to, also execute a "fork" and get a child of its own. The original parent won't know about this grandchild at all. So, if the child has a child (call it "grandchild"), and then dies, the parent will wake up. The grandchild is still in there milling. For instance, it might be managing all requests from everyone for the line printer. Thus, user's files don't get all jumbled up together on the printer, but appear one after the other. This grandchild, off running by itself, is called a "daemon", since it appears to have a life of its own independent of all other system activities. Needless to say, some special checks have to be done to make sure that no more than one daemon for the same device gets created, or the whole effect is lost.

I don't have the faintest idea what I'll talk about next time, so there. Requests, anyone?

IT MAY OR MAY NOT COME IN THE MAIL

-THOUGHTS ON PARTS

GUEST COLUMN BY JEFF TOLLIVER

Cowtown Electronics Supply Sources: Or, Where to Buy It in Buckeye Country

--Radio Shack The usual...Heavy on sound gear in the campus area, more into CB elsewhere. Hellish guarantee but keep the sales slip! 24 local shops plus regional office and warehouse. (Good for scrounge buy)

--Olson A few stores about town. Not well stocked with loose parts. Seems (as noted earlier) to lean toward TV and CB. Check addresses in phone book.

--Lafayette Almost extinct in the Columbus area. Stock is melange of pseudo-surplus and company name schlock. Elsewhen or where Lafayette may be good but locally they seem the bottom of the chain shops. Just one at 5236 Cleveland.

--Hughes-Peters 11th Avenue (across from Fairground gates.) Have a catalog with just about every nameable component. Seems to be heavily into RCA and GTE. Not everything in stock but will order from main warehouse in Cincinnati. If you can buy in lots of 50 or 100 the cost breaks down nicely; otherwise you pay!

--Thompson Radio & Electronics 182 E. Long. Mostly radio and TV supply, some CB. Good place to start search for oddball or slightly out of date components.

--Whitehead Radio Co. 124 N. Grant. Prominent radio, TV and CB stock...astronomical prices compared to others. Other than for quality, this is not the place to go.

--Starr Surplus Sales Co. 1038 N. High St. Government surplus and private sector schlock. Nice place to stop and browse. One section of shop is predominantly parts, components, and miscellaneous junk. The other is all shapes, sizes, and varieties of testing and monitoring equipment. As far as I can tell there are no fixed prices, so you can haggle a bit. (Sub-note: There's even an old studio TV camera...on tripod!)

--Universal Service, Amateur Equipment & Parts 114 N. 3rd. St. Self-explanatory. High quality/ditto prices.

Non-Electronics Sources:

--Akers Hardware A good place to look for unusual tools or hard to locate items like 2-56 taps for electronic assembly. Nice place to browse. Lotsa stock on walls, ladders on wheeled track to climb & get at it. At High and Fifth Avenue.

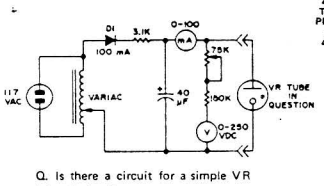
--Cadillac Plastics Cutoff room is a priority stop. Off-size and leftovers sold by the pound. Some rod & tube, a lot of sheet. At spring, just up from Neil.

--North American Rockwell Excellent source of sheet aluminum & steel (aircraft grade.) Sold by the pound. Other surplus only by sealed bid. (Rather inconvenient for transient techies.) Extreme east Fifth Avenue at Yearling Rd.

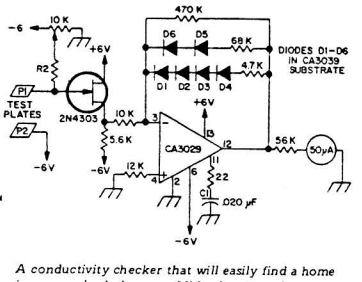
(Back to Chicago again-- Thanks, Jeff! Well, we've had Denver and Columbus. Who's next?)

```
      ∇ALIEN[□]∇
    ∇ ALIEN
[1]   'HOW MANY ALIEN NAMES DO YOU WANT?'
[2]   M←□
[3]   R←1
[4]   L←'AAABCDEEEEFGHIIIJKLMNOOOPQRSTUUUVWXYYY''Z'
[5]   L[?40];L[?40];L[?40];L[?40];L[?40];L[?40]
[6]   R←(R+1)
[7]   →((R*(M+1))×1)+8
[8]   →5
[9]   →0
    ∇
```

TRY IT!



Q. Is there a circuit for a simple VR tube checker?
A. The circuit in the figure works well. The variac voltage is varied up. When the VR tube fires, read the milliammeter and voltmeter. Good tubes will fire at their rated voltage and current.



A conductivity checker that will easily find a home in anyone's darkroom. With the test plates immersed in a flowing-bath print washer, the meter will indicate a lowering amount of conductivity as the hypo is washed away from the prints. When the meter indication approaches the measurement obtained from pure water, the prints or film will be nearly hypo-free. From "Handbook of IC Circuit Projects," by Tab Books.

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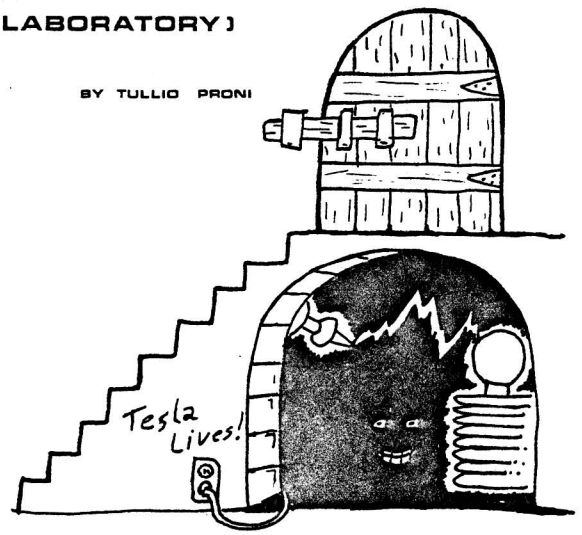
Whew!

NOTES FROM THE UNDERGROUND (LABORATORY)

BY TULLIO PRONI



Greetings aspiring machinists and fellow mad scientists. Did last issue's column tempt you into playing with Plexiglass? Did you yield to the smooth shining beauty of its acrylic wonder? But was the rush of excitement transformed into a craving that grows stronger and which must be fulfilled? ('...he stroked her feverishly throbbing 1" molded bar stock...'--Ed.) No need to worry. If your shaking hands can hold the page still enough for you to read it you will soon have the information you need. Yes, my friend, I will tell you the truth about machining plexiglass! But to machine plexiglass one must have machines. ("Aye, there's the rubbing compound!"--Ed.) Therefore I will discuss, in order of importance (and cost) the four most useful machines for doing plexiglass work.

Perhaps the most useful machine in plastics work is the buffing wheel. This machine consists of an electric motor driving two "wheels" made of layers of cloth sewn together. The wheels may have different sizes and widths. One of the wheels is usually used to buff the piece and the other is used to clean off the buffing compound. The procedure for using the buffer is as follows: buffing compound from a stick or jar is applied to one of the wheels while it is turning. The piece of plastic is then held against the wheel until it is shiny, then the piece is pressed against the other wheel to rub off any buffing compound that may have remained on it. The reason this piece of equipment is so important is that hand buffing takes a long time and, without buffing, plastic just does not look that good.

There are a few tricks to using a buffing wheel. The most important is to get the right buffing compound. You should buy it from a plastics dealer and not from a hardware store. Hardware store buffing compounds are not fine enough, no matter what your friendly salesman may tell you. Another tip is to clean your wheel. After buffing for a couple of hours small bits of dirt and plastic may become embedded in the wheel. To clean them out press a hacksaw blade against the wheel while it is turning. Another good idea is to sand your piece before buffing. While it is possible to buff even a hack saw cut out of plexiglass, it takes a while. Minutes spent sanding a piece with fine or very fine sandpaper can save you hours of buffing. While these tips will help, nothing can substitute for practice.

Well, that about wraps up my machine tool roundup. If anyone is interested in buying or has access to machine tools and wants more info please write. Next issue it's back to electronics and an analog circuit primer--but for now CIAO

Another very useful piece of equipment is the belt sander. A belt sander consists of a large loop of sandpaper (actually more like emery cloth) which is rapidly rotated by motor. There are many varieties. In some the belt is upright and in others it is horizontal. The belt's width may be anything from a few inches to a foot and the grit may be anything from ultra fine to extremely rough. The important thing is that it permits you to shape plastic quickly. As an example, let us suppose that you want to shape a prism out of a 1" sheet of plexiglass. All you would have to do is cut the plastic into 1" strips and then press one edge against the belt until half the block has been sanded away. This should take you less than a minute. Assuming you glued it all together to begin with, you now merely buff it and your prism is made.

The belt sander is also very useful in flattening out rough cuts. If you are using a hacksaw it is rather hard to cut a 100% straight line, but a minute on the belt sander will make the raggedest line straight. It is hard to list all the uses a belt sander has in plastics work but take my word for it that at a cost of about $50.00 it is a real bargain.

A slightly more expensive piece of equipment which is almost as handy is the table saw. A table saw has a circular blade 5"-12" in diameter mounted under a metal "table" so that an adjustable amount of blade protrudes above the table. The table has a bar or bridge across it parallel to the blade. The position of the bridge is adjustable. Thus by pushing one side of a piece of plastic against the bridge as you cut it you can be sure that your cut is parallel to that side. If you plan to do a lot of plastics work the table saw is a must. It is a good deal faster and makes cleaner cuts than anything else I have ever used. Its only disadvantage is that it will cut through your body even better than it cuts through plastic so you have to be careful. Keep your body as far away from the blade as possible and use a small piece of wood to push small plastic parts through. The saw can catch on a piece of plastic, pull it out of your hands, and throw it across the room or into your face if you let it. Safety glasses are a good idea while using any power tool so get a pair.

Now we come to my favorite piece of equipment--the lathe. There are two basic types and a huge variety of sizes. The wood lathe is simpler and as the name implies is used for machining wood. The metal lathe is more complex (and expensive) and is used for plastics as well as metal. Lathes are rated by the size of material their chucks will hold. Thus the largest piece of plastic that a 6" lathe will machine is 6" in diameter.

Basically all that a lathe does is spin a piece of material so that you can cut it with a stationary bit. This gives you a symmetrical cut which always results in a circular cross-section. What this means is that you can turn anything into a rod or cone of whatever you want. If you've ever seen a GT ray gun you've seen what a lathe can do.

Perhaps the easiest way to show how a lathe works is to describe how a simple operation, such as making a rod, is performed. Lat us assume you have a square rod which you wish to change into a circular rod. You start by placing the rod into the chuck and tightening it into place. The chuck of a lathe is similar to the chuck of a drill except that it is larger and has a square key. You then remove the key and turn on the lathe. Most lathes are reversable so make sure the chuck is rotating toward you. Next maneauver the bit so that it just begins to cut the plastic. The bit is mounted in a holder which has at least two crank-wheels on it. One will cause the bit to go back and forth (parallel to the rod you are machining) and the other will cause it to go toward the rod. You use the latter to adjust the depth of your cut. Now move the bit back and forth while gradually increasing the depth of the cut and before you know it you'll have a circular rod.

STAR WARS

The big GT Star Wars Party wasn't really planned. It just sorta happened. By the second Saturday of release, I decided I had waited long enough. To hell with lines long enough to get to Alderon the hard way: I was going to see it. The best way to make a line bearable is to turn the waiting into a festive occasion. So the word got around that a few of us were going to get into line early and happily chew the fat until showtime.

Word got around, all right. About 25 people who can loosely claim to belong to the Chicago fannish community showed up. GT attendees included myself, Carol, Steve Johnson, Jim Fuerstenberg, Clyde Jones, Tullio, Gus and Kathy Flassig, Alice Insley, Marco Mendez, Mike Blake, and Doug Price. By the time I got there our local section of line was twenty feet long and growing.

Things had not yet had a chance to become dull before Steve roared up in his Rumbler with Joe the robot, newly painted. Joe, by some odd coincidence, bore a resemblance in form to the inimitable Artoo Deetoo, and Steve took masking tape and blue paint in hand to further to deception. With an old 914 copier lens in front, and his peppy new motors, Joe was an instant hit all up and down the line.

We ran him in and out of the line, chased little kids (who then turned around and chased him right back) and attracted one hell of a lot of attention. So much so that the manager invited Steve, Tullio, and Jim into the theater to run him around for the employees. Steve had his prototype light sword, Tullio had his photon cannon, and several other GT rayguns were there, which prompted the manager to give GT a place at the head of the line for the auditorium, and also to let several of us in free. The GT group took up several rows worth of the best seats, and Joe got the best seat of all: right up frnt, standing guard directly beneath the big, fantastic screen.

Word gets around fast. Later that week Steve got a call from 20th Century Fox's publicity department, who asked if Steve would bring Joe down to the Esquire Theater to do his thing, in exchange for some free tickets. That Friday night Steve, Jim, Clyde Jones, and myself showed up with Joe, and had a fabulous time cavorting for the neuvaux riche before the 8 pm show. Clyde was wearing a terrific homebrew Darth Vader costume, including a fiendishly accurate facemask. Except for the touch of beard protruding below the mask, Clyde had it all down pat, right to the rumbling menace of a voice and noisy breathing.

A Fox photographer took pictures of Joe standing in the ticket line, mingling with the crowd, and confronting a suitably menacing Vader-Jones. When showtime came, we got first pick of seats once more, and marched Joe down the main aisle, and steered him into a seat right next to us.

As though that weren't enough... A week or so later, Steve got another call, this one from a chappie named Mark Hamill, who, along with Harrison Ford and Carrie Fisher, was in Chicago on a promo tour, had heard about Joe from the Fox people, and wanted to see him personally. Steve tried desperately to get ahold of your editor, but he was supping at his mother's and missed all the fun, as usual. Steve and Jim took Joe down to the Hotel, and shared champagne with Hamill and Ford. Carrie Fisher had apparently OD'd on all the Star Wars publicity and rather kept to herself. Steve and Jim had a great time, and though of course I'm not a celebrity chaser...well...I kinda wish I coulda been there too.

The moral of the story is: Build robots, and Be At Home When Destiny Calls. (Or at least leave a forwarding number!)

ODD BODKINS

LIFTED FROM HERE & THERE

TABLE I Characteristics of MAN LED Readouts

MAN-1 – Red, 69mm (0.27") high numbers, common anode, DIP case, uses 7447 driver.

MAN-1A – Similar to MAN-1, but darker – has red epoxy case.

MAN-1B – Similar to MAN-1, but different decimal point connection.

MAN-1BA – Similar to MAN-1B but red epoxy case.

MAN-1001 – Similar to MAN-1 but only displays +, -, or 1.

MAN1001A – Similar to MAN1001 but red epoxy case.

MAN1002 – Similar to MAN-1 but intended for hexadecimal display; can be used in counter same as MAN-1 but don't try to use decimal point.

MAN1002A – Similar to MAN1002 but red epoxy case.

MAN-2 – Alphanumeric display consisting of dots. Don't use.

MAN-2A – Similar to MAN-2 but has red epoxy case.

MAN-3 – Red, common cathode, 29mm (0.115") high numbers, flat case with different pin connections from MAN-1, uses 7448.

MAN-3A – Similar to MAN-3 but has red epoxy case.

MAN-3M – Similar to MAN-3A but has different pin arrangement.

MAN-4 – Red, common cathode, needs 7448, 48mm (0.19") high letters, DIP case but different pin connections.

MAN-5 – Green, otherwise similar to MAN-1.

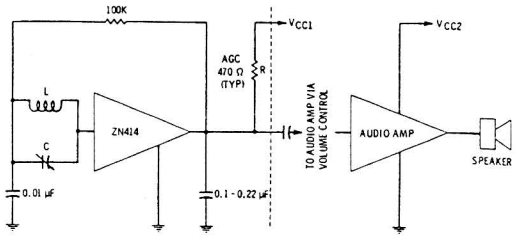
MAN-6A – Red and 1.42cm (0.6") high numbers, a wide DIP-style case, but otherwise similar to MAN-1A.

MAN-66A – Similar to MAN-6A.

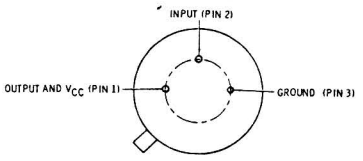
MAN-8 – Yellow, otherwise similar to MAN-1.

MAN-10 – Similar to MAN-1, requires slightly less current.

MAN4001 –Similar to MAN-4 but only displays +, -, or 1.



(A) Circuit using a ZN414.



(B) ZN414 pin diagram—bottom view.

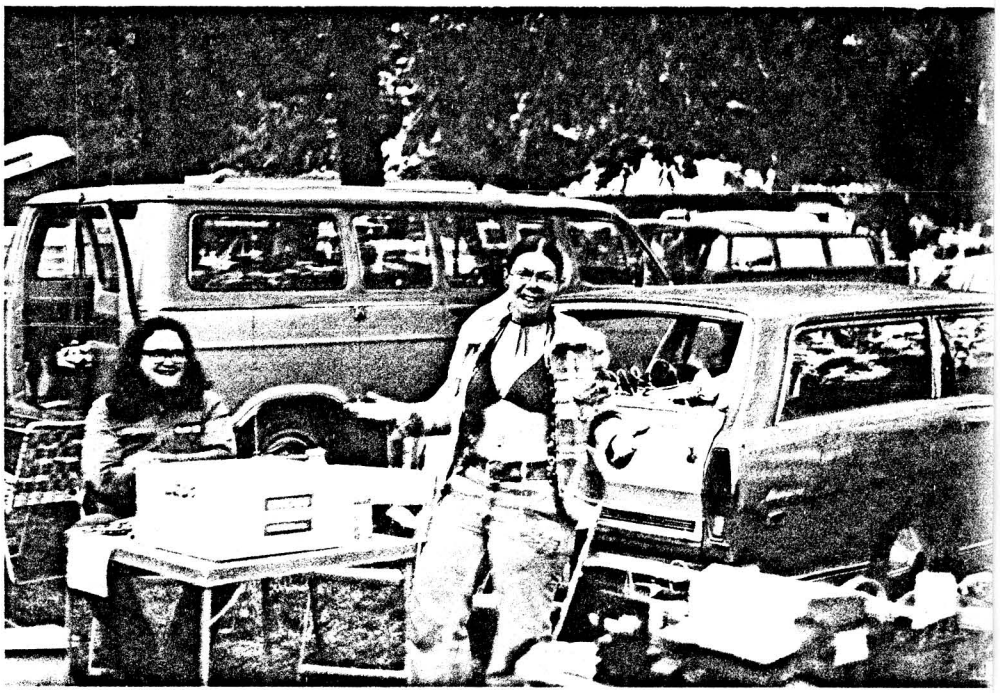
Fig. 6-4. Ferranti Semiconductors IC a-m radio receiver.

PYRO
PICTURE PAGE

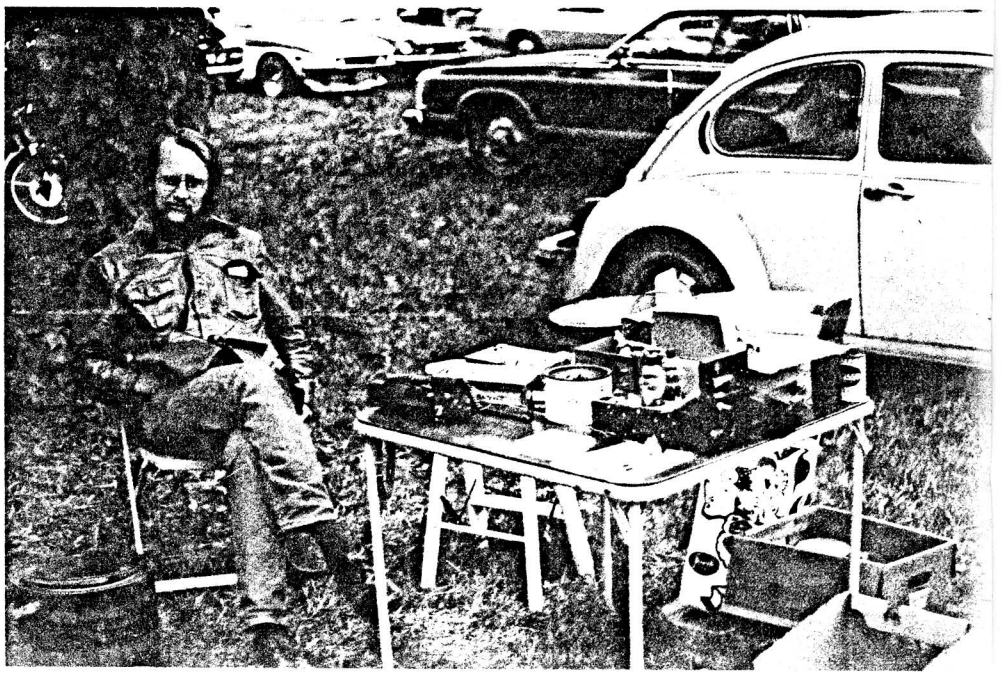
Your Editor and Editrix
hard at work not editing
Pyro Technics

"Not all the goodies are on
the table, guys!"

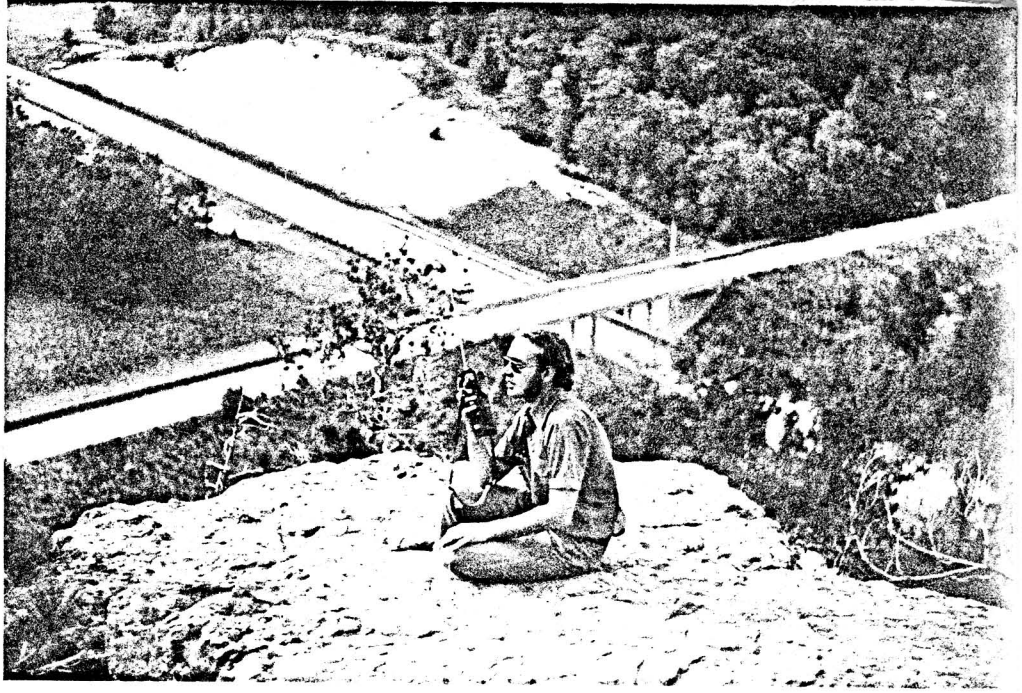
(Santa Fe Hamfest, June
13, 1977; Kathy Flassig
stage center)



Ben Kuehlhorn guarding the..
er...treasure



"CQ Field Day! CQ Field Day! CQ FIELD DAY! CQ EVERLOVING FIELD DAY! ARRGH!!"



Cap Chat, Quebec, 1972. The telescope your Editor almost finished, almost pointed at the solar eclipse we almost saw. Sigh.

Carol and Jeff Duntemann
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